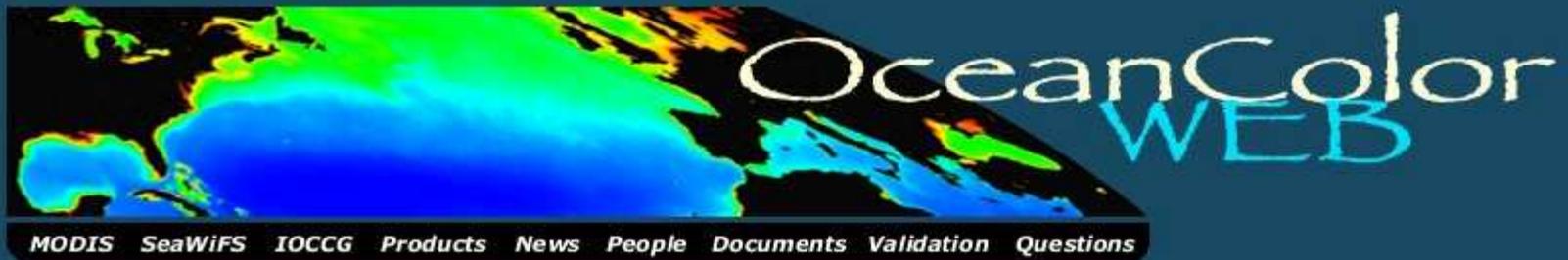


Satellite Tools for the Space Oceanographer

Michael MacDonald
NASA Ocean Biology Processing Group

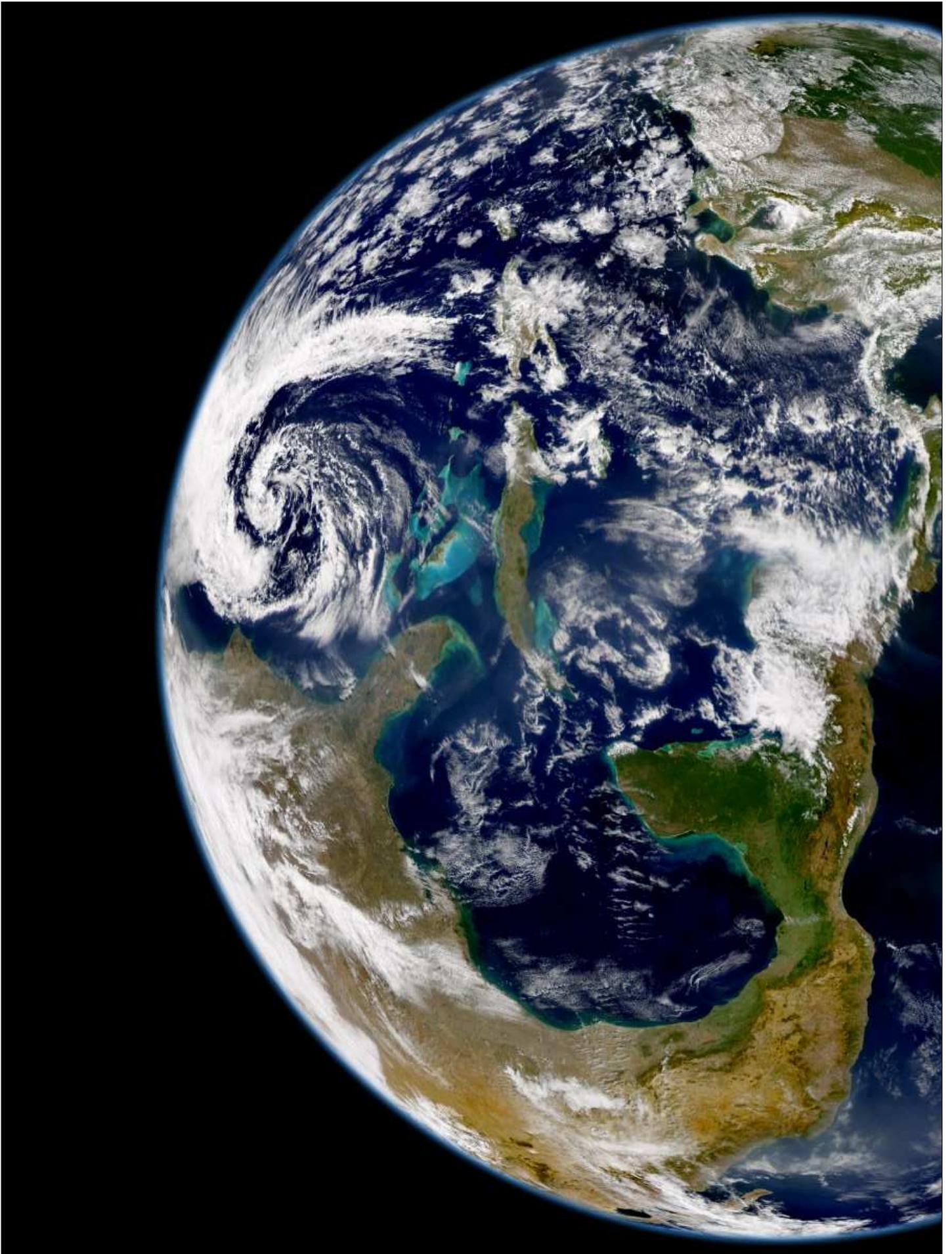
Centers for Space Oceanography Symposium, January 31, KSC Florida

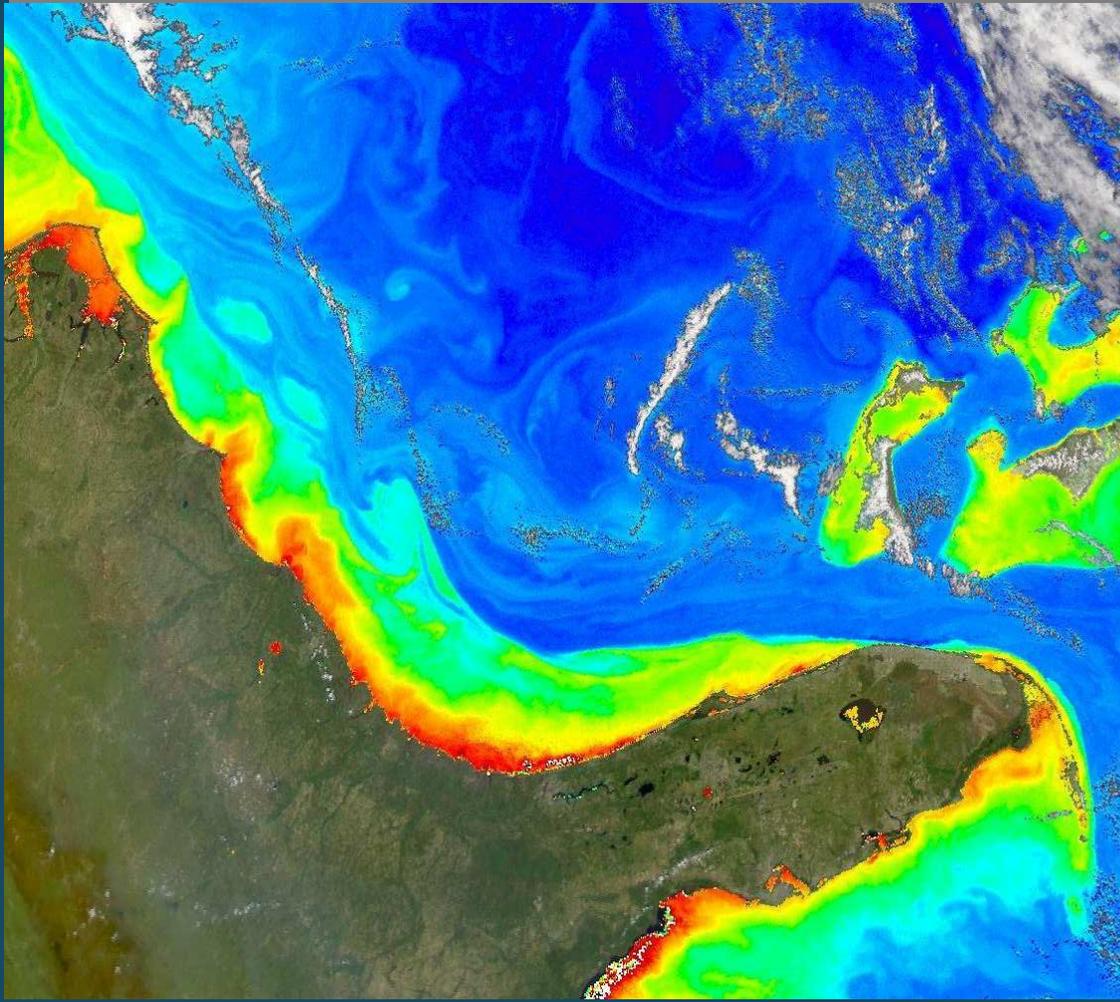


**The OBPG: We may have
a lousy acronym but
we're vortex-free!**

**Michael MacDonald
NASA Ocean Biology Processing Group**

Centers for Space Oceanography Symposium, January 31, KSC Florida

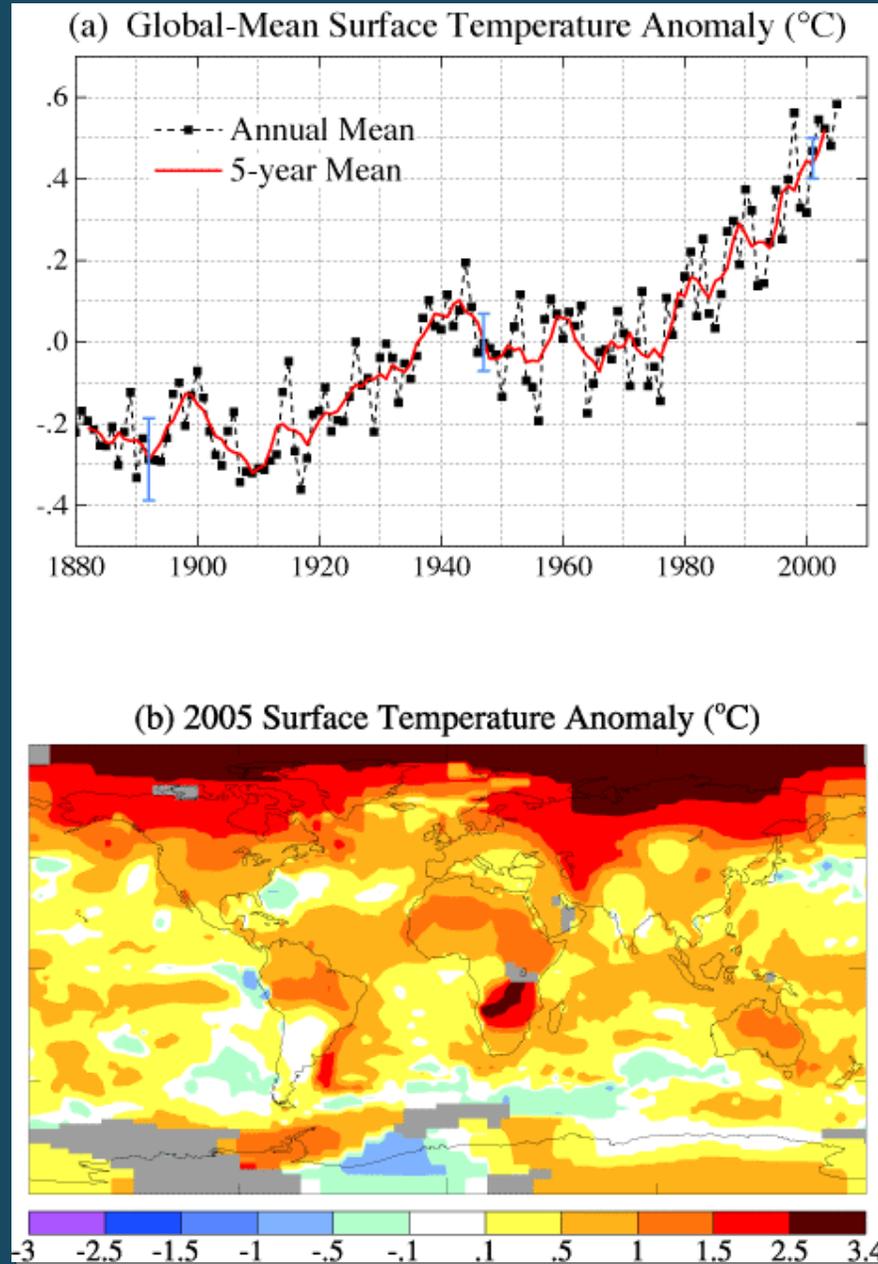




SeaWiFS Chlorophyll *a* 13 Apr 2003
NASA/GSFC and ORBIMAGE
Chlorophyll *a* Concentration (mg / m³)



2005 - Hottest year on record



Courtesy of GISS Surface Temperature Analysis (GISTEMP)

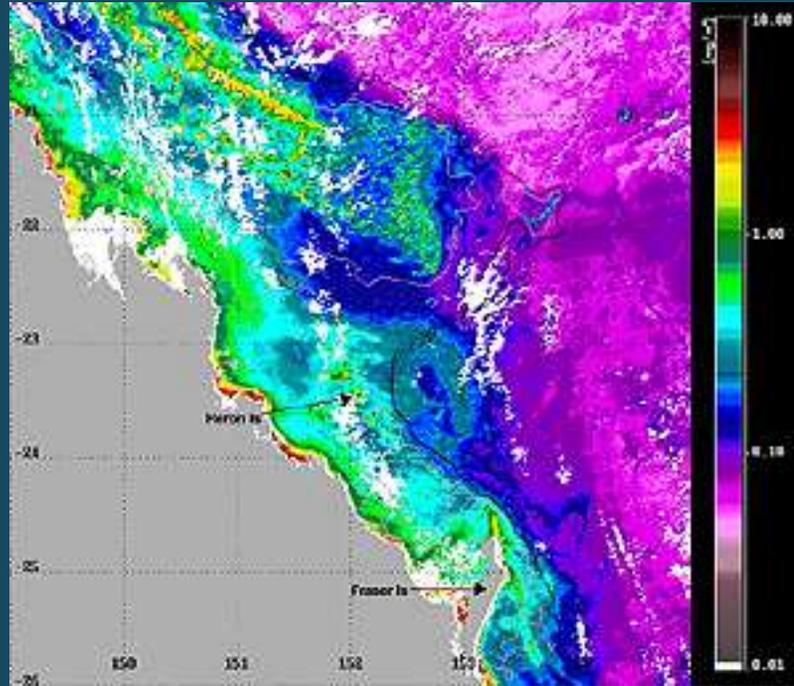
Coral Reefs



“In 2002, 60 percent of the Great Barrier Reef bleached, after which, five to 10 percent died... the worst bleaching event on the Great Barrier Reef on record... [In 2005] we are worried because we have higher anomalies, which may result in greater damage.”

“...we need to recognise that reefs will be extremely fragile over the next few decades as we try to get [global warming] under control. This is a fragile patient that needs all the care it can get.”

-Prof. Ove Hoegh-Guldberg, Centre for Marine Studies, Univ. of Queensland



MODIS Aqua Chlorophyll a image of the
Great Barrier Reef (8 January 2006)

“Satellite technology has become critical to our efforts to understand the changes going on. By studying water temperature and ocean colour, we are gaining insights into the changing dynamics and biological response, and how complex and vast these really are.”

“The NASA OBPG has put enormous effort into bringing the benefit of satellite technology to the broadest user community.”

-**Dr. Scarla Weeks**, Centre for Marine Studies, Univ. of Queensland

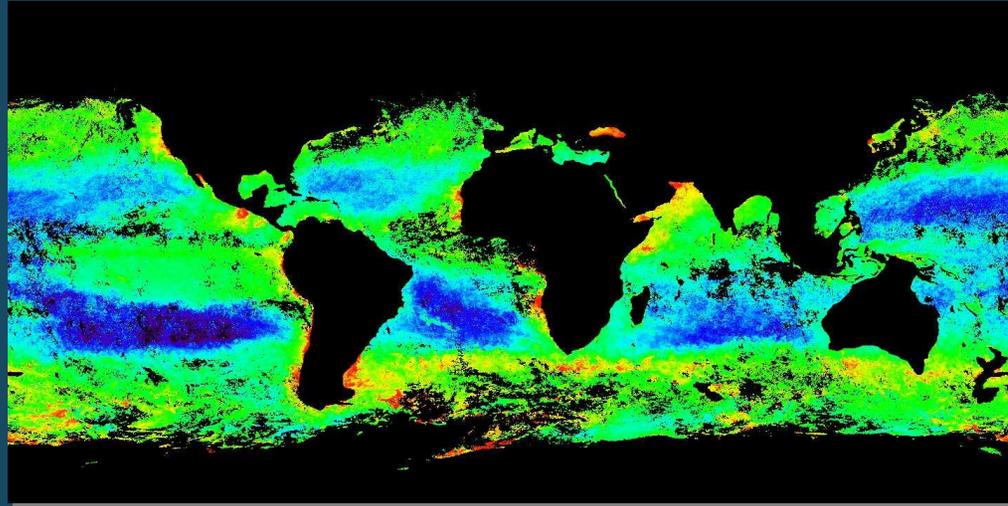
Deep-Water Chlorophyll Images

common-bin 12-day composite, Winter 2002

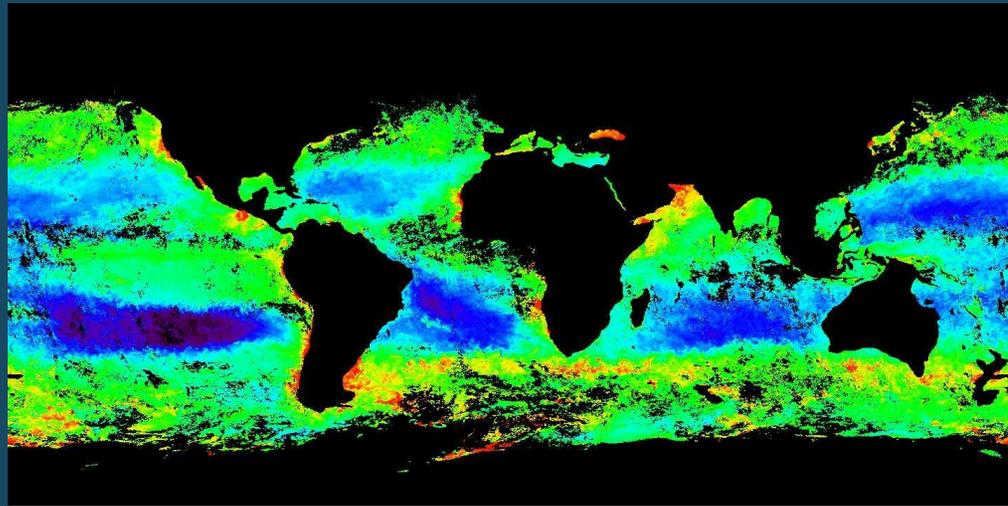


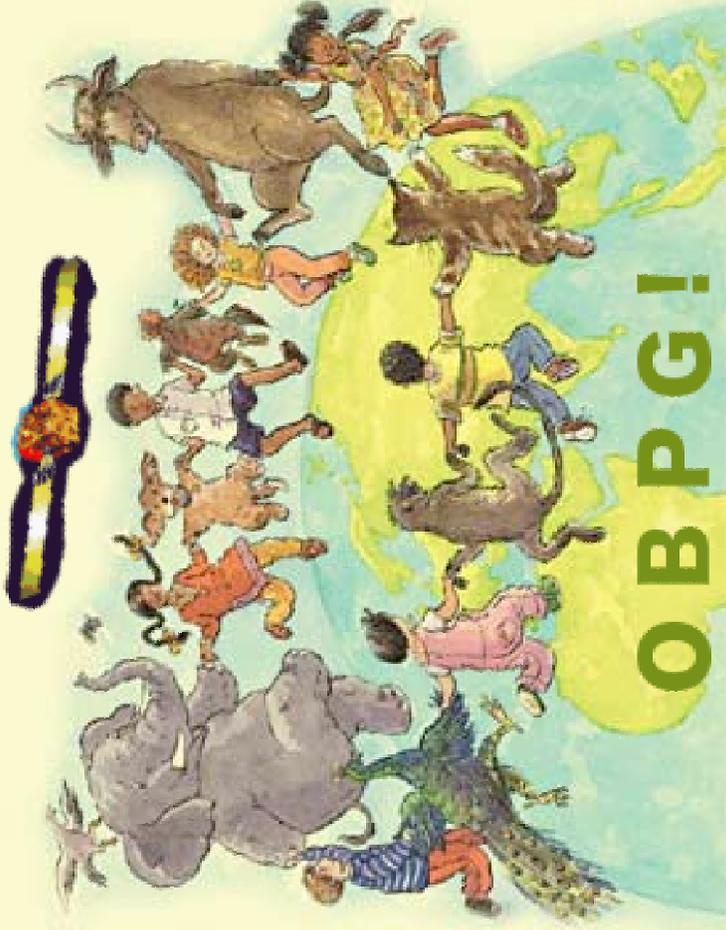
0.01-1 mg/m³

SeaWiFS R5



MODIS/Aqua R1





OBPG!

The Ocean Biology Processing Group

A Component of NASA's Missions-to-Measurements Initiative

- Designated NASA team responsible for the **processing and distribution** of **Ocean Color** and ***SST*** data from various spaceborne instruments.

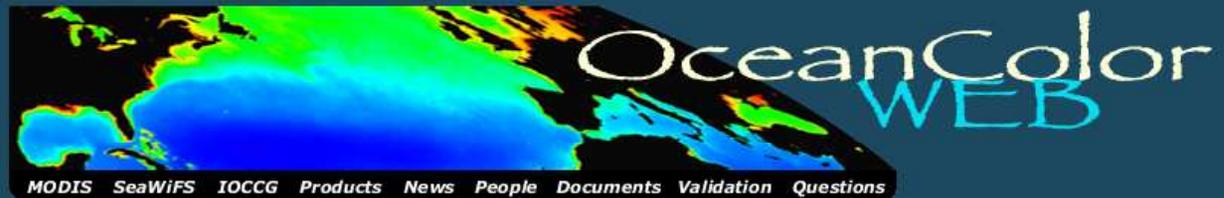
Ocean Color: CZCS, OCTS, SeaWiFS, MODIS/Aqua

SST: MODIS/Aqua, MODIS/Terra

- Product Evaluation & Test Element (PEATE) for OC & SST on **NPP/VIIRS**
- Science Team Lead for OC on **NPP/VIIRS**.
- Designated as the software development, processing, and distribution element for Sea Surface Salinity measurements from Aquarius.

Ocean Color Web

Consolidated data Access, information, and services



Data Access

Level 1 and 2 Browser

Visually search the ocean color data archive and directly download and/or order data from single files to the entire mission. Extensive online [HELP](#) and tutorials available.

Level 3 Browser

Browse the entire Level 3 global ocean color data set for many parameters and time periods and download either JPEG images or digital data in HDF format. View [time series plots](#) of selected SeaWiFS parameters for selected regions of the globe.

Data Subscriptions

Request a subscription for Aqua data to be staged on an [FTP](#) site. You can [check the status](#) of an existing subscription.

Data by FTP

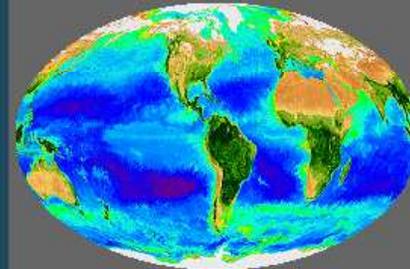
The Project maintains several FTP sites containing the most popular data products including the complete Level 3 data archive.

GES DAAC

The GES DAAC is the official archive for MODIS SST data (Terra and Aqua). They also distribute OCTS and CZCS ocean color data sets.

Ocean Color Web Feature

Recent topics and imagery of interest to the OceanColor community.



An updated animation of the [SeaWiFS biosphere data set](#) encompassing eight years worth of ocean color (chlorophyll concentration) and land vegetation (normalized difference vegetation index) observations from September 1997 through July 2005 is now available. Click on the above reduced subset of that animation to learn more.

Image Gallery

NOTE: All SeaWiFS images presented here are for research and educational use only. All commercial use of SeaWiFS data must be coordinated with [OEBIMAGE](#)

Ocean Color Distribution Statistics

Support Services

SeaDAS

A comprehensive image analysis package for the processing, display, analysis, and quality control of ocean color data.

SeaBASS

An archive of in situ data, both oceanographic and atmospheric, used for algorithm development and satellite validation.

Register for Support Services

Register for support services, including:

- SeaWiFS data access authorization
- Access to Near Real Time image support
- Ocean Color Forum
- Ocean Color Mailing List

Support Services

- Overflight predictions
- Near real-time imagery and data for cruise support

Data Processing

The ODPS site contains information related to the ocean color data production system.

Employment Opportunities (IOCCG listings)

OceanColor Forum

Ocean Color Forum - Welcome, mike

[Forum](#) [OceanColor Home](#) [Help](#) [Search](#) [Options](#) [Logout](#)

Forum

[Mark Old](#) [Mark Read](#) [New](#) [Unread](#) [Replies](#) [ToDo](#) [Feeds](#) [Info](#)

<input type="checkbox"/> Ocean Color	Posts	Last Post
<input checked="" type="checkbox"/> OceanColor Announcement	44 (2 new)	2006-01-03 09:22
<input type="checkbox"/> Algorithms and Products	Posts	Last Post
<input checked="" type="checkbox"/> Frequently Asked Questions	23	2005-10-25 14:24
<input checked="" type="checkbox"/> Satellite Data Products & Algorithms	663 (80 new)	2006-01-27 16:45
<input checked="" type="checkbox"/> Satellite Data Access	463 (10 new)	2006-01-26 17:36
<input checked="" type="checkbox"/> Field Data	14	2005-09-12 14:27
<input checked="" type="checkbox"/> Mission Events	2	2004-04-23 12:17
<input type="checkbox"/> SeaDAS	Posts	Last Post
<input checked="" type="checkbox"/> SeaDAS News	17	2005-12-13 14:43
<input checked="" type="checkbox"/> SeaDAS FAQ	16 (3 new)	2006-01-23 14:23
<input checked="" type="checkbox"/> SeaDAS: Known Problems and Fixes	8 (2 new)	2006-01-05 16:33
<input checked="" type="checkbox"/> SeaDAS: General Questions	1649 (347 new)	2006-01-27 17:33
<input checked="" type="checkbox"/> MODIS Direct Broadcast Support	22	2005-12-14 16:25

Curator: OceanColor Webmaster
 Authorized by: gene carl feldman
 Updated: 19 December 2005

[Privacy Policy and Important Notices](#)



How to get the data...

Data Distribution

- **Instant access:** entire archive of Level-1A through Level-3 data for all missions is stored online
- **Minimal latency:** MODIS L1A/GEO/L1B/L2 data available 2-5 hours after satellite observation
- **Web-based browser:** simple viewing/order/download tool for the entire multi-mission data set
- **Full ftp access:** most data may be downloaded via ftp
- **Data subscriptions:** automatic staging of new data products to user-specific ftp accounts

Level-3 Multi-Sensor Browse & Distribution

Level-3 Standard Mapped Images

[Help](#)

[View the color scales.](#)

[Browse the rolling 32-day composites.](#)

[Browse the "filled-in" version of the rolling 32-day biosphere composites.](#)

[Browse the seasonal, monthly, and 8-day climatologies.](#)

Aqua-MODIS	Chlorophyll	Diffuse attenuation	nLw at 551 nm	Aerosol optical thickness	Angstrom coefficient	SST
SeaWiFS	Chlorophyll	Diffuse attenuation	nLw at 555 nm	Aerosol optical thickness	Angstrom coefficient	
	Biosphere	PAR	NDVI	Land Reflectance		
OCTS	Chlorophyll	Diffuse attenuation	nLw at 565 nm	Aerosol optical thickness	Angstrom coefficient	
CZCS	Chlorophyll		nLw at 550 nm	Aerosol optical thickness	Angstrom coefficient	
Evaluation Products	Calcite	Fluorescence Line Height				

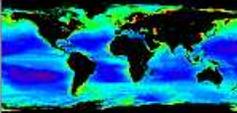
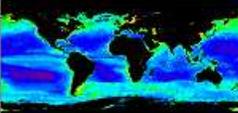
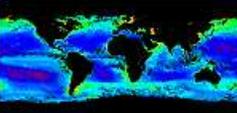
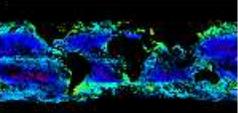
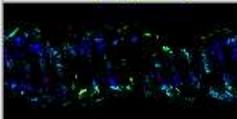
						Jul 2002	Aug 2002	Sep 2002	Oct 2002	Nov 2002	Dec 2002
Jan 2003	Feb 2003	Mar 2003	Apr 2003	May 2003	Jun 2003	Jul 2003	Aug 2003	Sep 2003	Oct 2003	Nov 2003	Dec 2003
Jan 2004	Feb 2004	Mar 2004	Apr 2004	May 2004	Jun 2004	Jul 2004	Aug 2004	Sep 2004	Oct 2004	Nov 2004	Dec 2004
Jan 2005	Feb 2005	Mar 2005	Apr 2005	May 2005	Jun 2005	Jul 2005	Aug 2005	Sep 2005	Oct 2005	Nov 2005	Dec 2005

[Previous](#)

Chlorophyll (Aqua-MODIS)

rows in the rightmost column

[Next](#)

Yearly	Seasonal	Monthly	Weekly	Daily
				
2004 9km png HDF 4km png HDF	Autumn-2004 9km png HDF 4km png HDF	Oct-2004 9km png HDF 4km png HDF	23Oct2004 to 30Oct2004 9km png HDF 4km png HDF	25-Oct-2004 9km png HDF 4km png HDF  26-Oct-2004 9km png HDF 4km png HDF

Single File Browse and Download

△ < > ↺ 10 OIL SST

[Comment](#)

[Help](#)

[A2004038191500.L1A_LAC](#)

50,998,234 bytes

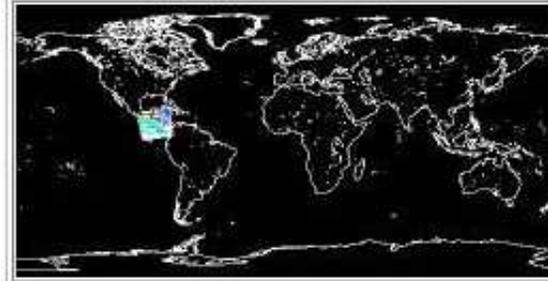
[A2004038191500.L2_LAC](#)

20,472,527 bytes

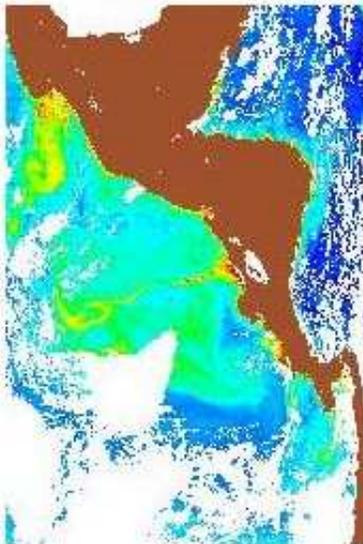
(The above hyperlinks point to [bzip2-compressed HDF files](#).
Documentation on these **prototype** products can be found [HERE](#).)

Saturday, 7 February 2004

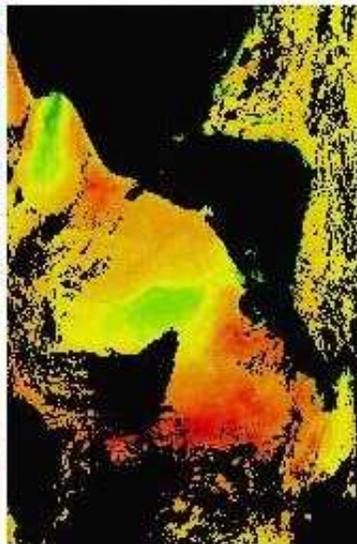
2004038



Chlorophyll



Sea Surface Temperature



Search Criteria

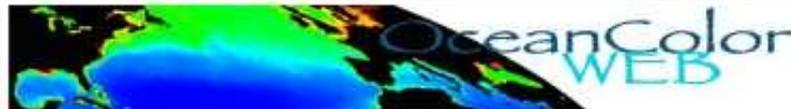
Time Period: Saturday, 7 February 2004

Sensors: MODIS(Aqua)

Area of Interest: Within 36 km of 16.5N,90.4W

Percentage of AOI that swaths must include: Any part

Number of swaths: 1 swath found



Multiple File Browse and Order

users can order one file or the entire multi-mission data set

SeaWiFS User Login | Display 10 at a time. | **ORDER DATA** | Comment | Help

S2004060182255.L2_MLAC			S2004059174213.L2_MLAC			A2004057181500.L2_LAC					
S2004060164427.L2_MLAC			A2004058172000.L2_LAC								
29Feb2004			28Feb2004			27Feb2004			26Feb2004		
****	****	****	****	****	****	****	****	****	****	****	
A2004060171000.L2_LAC			S2004058183847.L2_MLAC			S2004057175910.L2_MLAC					
			A2004059180500.L2_LAC			S2004058170107.L2_MLAC					

Search Criteria
Time Period: February 2004
Sensors: SeaWiFS and MODIS(Aqua)
SeaWiFS Data Types: MLAC
Area of Interest: Within 36 km of 43.2N,70.0W

1 2 3 4 5 6 7 8 9 10

Regional and Product Subsetting of Order

users only download what they need

Enter your email address.

In order to reduce the volume of data that you have to deal with, we can extract the geographical area indicated at right from the swaths you ordered before we place the data in our download area. (This extraction currently only applies to SeaWiFS files and MODIS level-2 files.)

Please choose one of the following options.

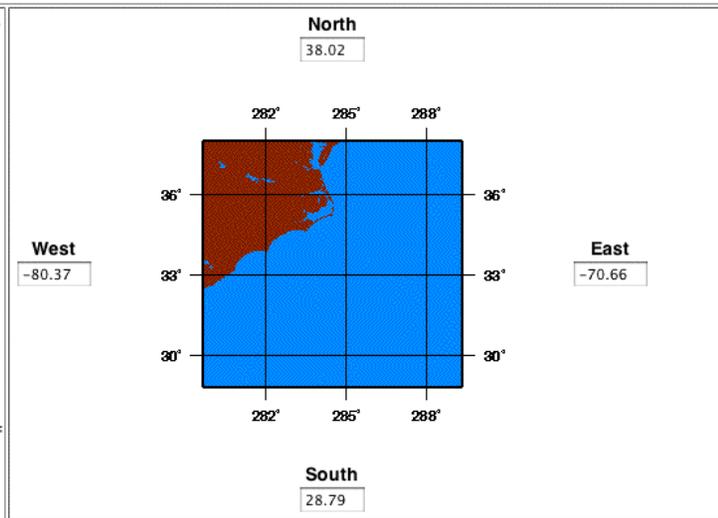
Do Do not extract my order for me.

You may adjust the extraction region by altering the coordinates at right.

The default coordinates are the ones which circumscribe the area or areas of interest that you used to do your search. If you started your search by just clicking on the world map without specifying a larger search radius, then you may want to increase the size of your extract region since the default search radius is 36 kilometers.

All four coordinates are expected to be in decimal degrees. Degrees north of the equator and east of the Greenwich meridian should be positive, and degrees south of the equator and west of the Greenwich meridian should be negative.

SeaWiFS extracts are processible with [SeaDAS](#).



Pick which data products you want for your selected scenes.

Level 1

If you plan to process Level-1 files using [SeaDAS](#), then you will also need the following.

- Meteorology & Ozone
- Attitude & Ephemeris (MODIS only)

Level 2

You may select to receive only the following checked level-2 products if you wish. If you select none of these and simply check "Level 2" above, then you will receive all of the available level-2 products for a given sensor.

- chlorophyll a
- K490
- normalized, water-leaving radiances
- aerosol products
- sea surface temperature (MODIS only)

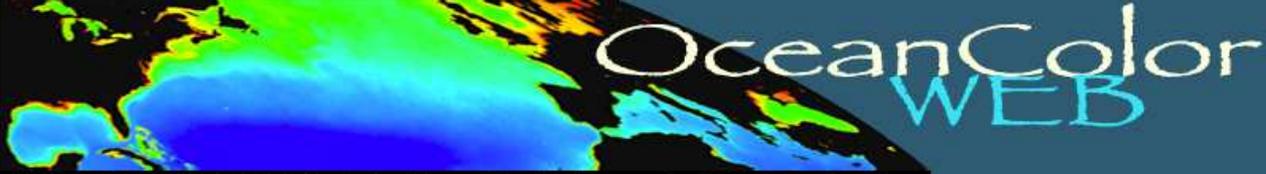
- Remind me when my order is about to expire.
- Require my email confirmation for early file deletion.
- Notify me when my data have been deleted from the staging area.

MODIS Direct Broadcast Receiving Stations



Virtual ground station concept

Data subscriptions can be created for limited geographic regions, allowing users to receive L1A, L1B, and L2 data for their area(s) of interest within 2-5 hours of satellite observation.



MODIS SeaWiFS IOCCG Products News People Documents Validation Questions

Data Subscription Request

Email address:

	North	South	West	East
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Start Date	28 ▾	Sep ▾	2005 ▾	
End Date	None ▾	None ▾	None ▾	

Level 1 Level 2 Ancillary Data Attitude/Ephemeris

Wait for Refined Processing Daytime Granules Nighttime/Mixed Granules

Near Real-Time Mapped Image Support

supporting field campaigns for collection of validation data



OceanColor Extracts and Mapping

1. Selected Mission

MODISA

2. Select timeframe for the data

Start Date: Jul 26 2005

Stop Date: Jul 27 2005

3. Specify a region

Select Existing Region: CostaRicaDome Name

Create New Region: Name

Description

View Region

North South West East

4. Select MODISA products

Aerosol Optical Thickness

Angstrom

Chlorophyll a

K490

Sea Surface Temperature

True Color

True Color - Cloud optimized

Water Leaving Radiance (412nm)

Water Leaving Radiance (443nm)

Water Leaving Radiance (488nm)

Water Leaving Radiance (531nm)

Water Leaving Radiance (551nm)

Water Leaving Radiance (667nm)

5. Select map attributes

Coastline

Color Bar

Frame

Grid

Label

Transparent Background

5 Threshold

600 Width

6. Select any hdf files to include

Level-1

Level-2

7. Select maps distribution method

Ocean Color FTP Server (oceans.gsfc.nasa.gov)

Ocean Color Website Distribution (Tile Regions)

Email:

donna.thomas@gsfc.nasa.gov

Other addresses (comma separated):

8. Select hdf distribution method (if hdf files selected)

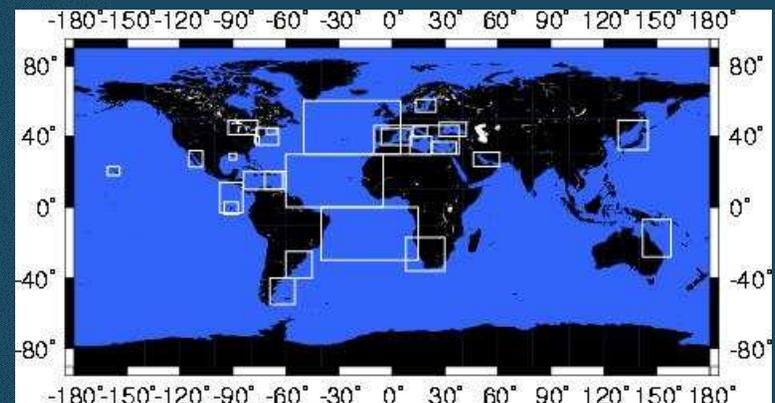
Ocean Color FTP Server (oceans.gsfc.nasa.gov) (Only option currently supported for HDF distribution)

Continue >>

Cancel

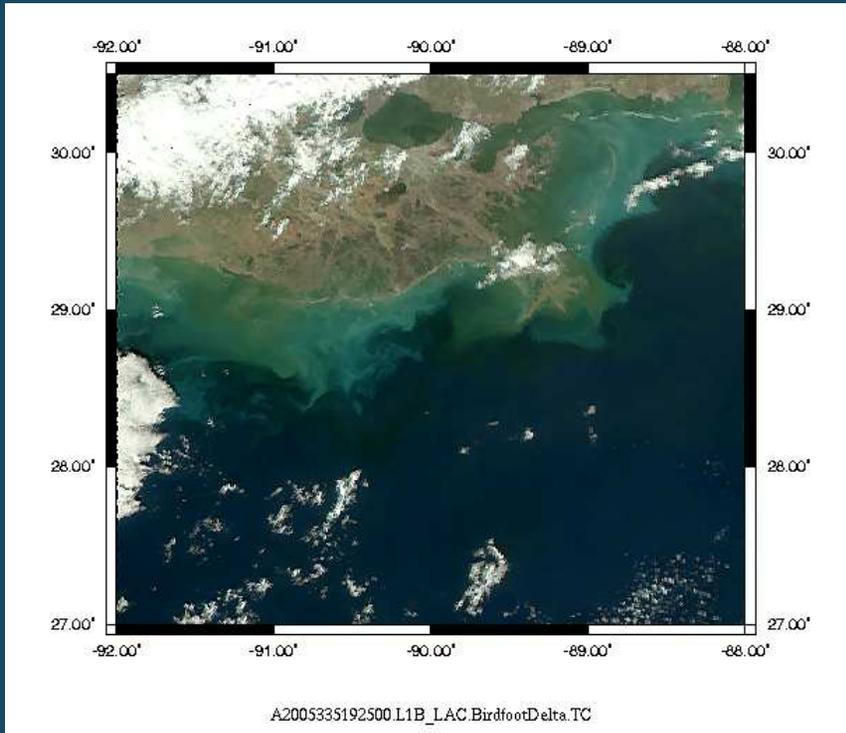
- select region
- select products
- select map characteristics
- receive daily images
- email or ftp

current subscriptions for image support



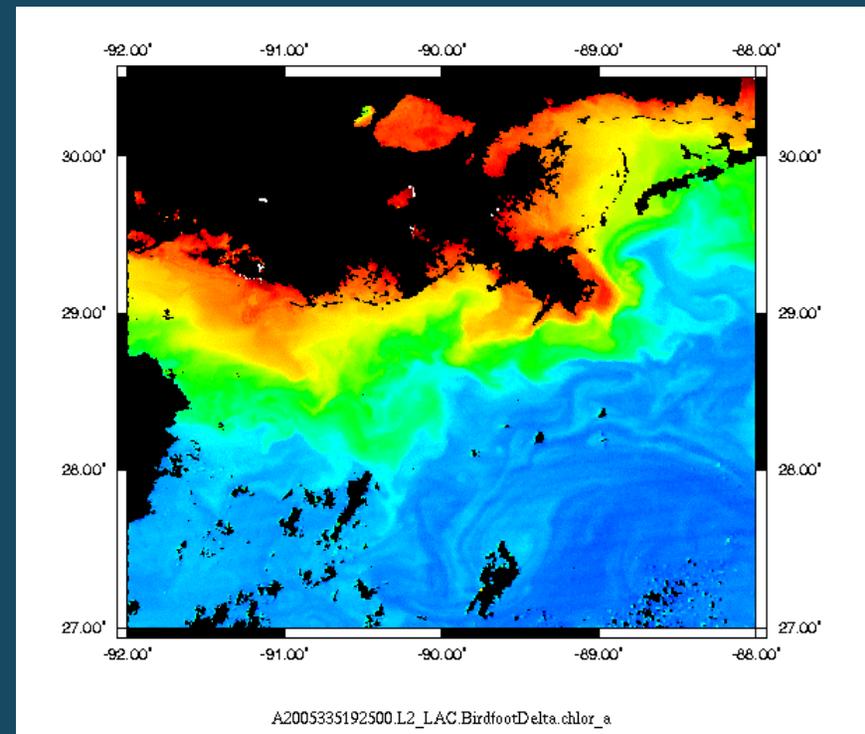
Near Real-Time Mapped Image Support

True Color



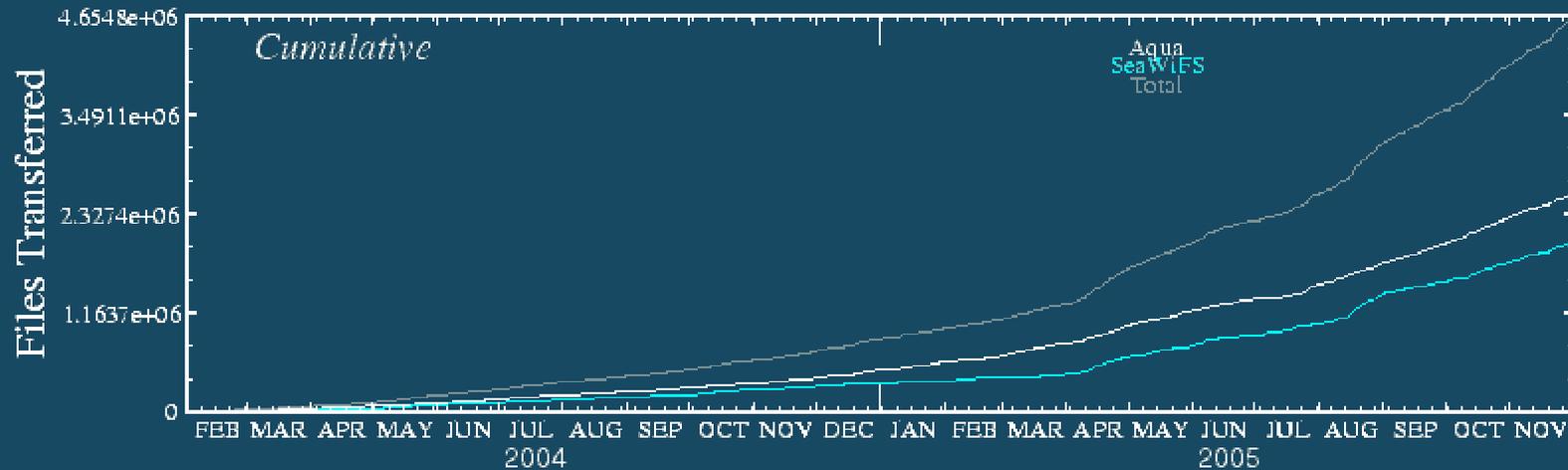
Option to receive corresponding L1 and L2 HDF files, extracted to the region

Chlorophyll-a



Files Distributed to Users

5.7 million since February 2004



Source	L1				L2				L3				Ancillary	Totals
SeaWiFS	HTTP	REQ	REC	ARC	HTTP	REQ	REC	ARC	HTTP	REQ	REC	ARC	ARC	SeaWiFS
	Files: 2494	297058	0	2611	Files: 3842	525249	0	1590	Files: 9165	0	0	625455	Files: 535783	Files: 2003247
	GB: 71.7	3636.3	0	14.5	GB: 68.7	2151.2	0	23.2	GB: 14.8	0	0	3295.2	GB: 557.07	GB: 9832.67
Aqua	HTTP	REQ	REC	ARC	HTTP	REQ	REC	ARC	HTTP	REQ	REC	ARC	ARC	Aqua
	Files: 15576	54249	18308	21036	Files: 42787	304417	455401	10209	Files: 21841	0	0	321904	Files: 1302814	Files: 2568542
	GB: 303.8	2443.9	559.6	204.7	GB: 286	2026.8	3116.9	83.7	GB: 35.2	0	0	1792	GB: 3879.48	GB: 14732.08
TOTALS	Files: 411332				Files: 1343495				Files: 978365				Files: 1838597	Files: 4571789
	GB: 7234.5				GB: 7756.5				GB: 5137.2				GB: 4436.55	GB: 24564.75

How to work with the data...

SeaDAS Features

- Most widely used ocean color software package in the world
- Display and analyze all data from the OBPG (+ other data, e.g. HDF)
- Software AND source code to process all data from L0 through L3
- Reproduces identical OBPG standard Ocean Color & SST products
- Will support NPP/VIIRS in the future
- Runs on Linux, Macintosh OS X, Sun Solaris, SGI IRIX
- Extremely active user support forums

Some Product Algorithms in SeaDAS

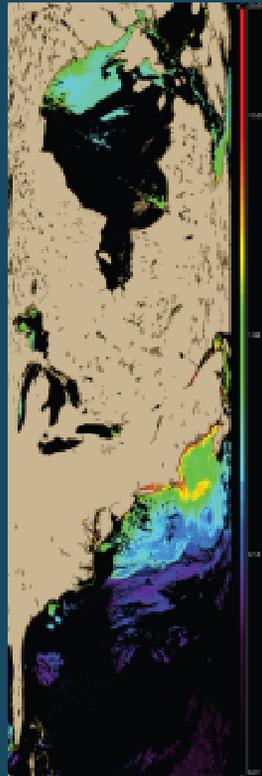
- **water-leaving radiances**
- **remote sensing reflectance**
- **SST (thermal and short-wave IR)**
- **chlorophyll (8 algorithms)**
- **diffuse attenuation of sea water**
- **IOP (GSM01, Carder, QAA):**
- **particulate organic carbon**
- **total suspended matter**
- **calcite concentration**
- **fluorescence line height**
- **PAR, IPAR**
- **aerosol products (AOT, Angstrom)**
- **intermediate products (Lr, La, etc.)**

Direct Broadcast Support

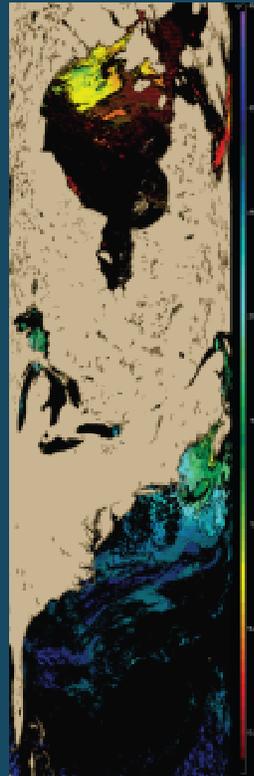
facilitating real-time product generation



True Color

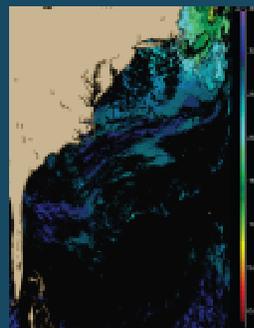
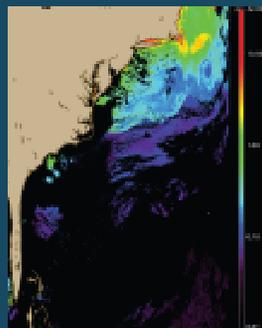
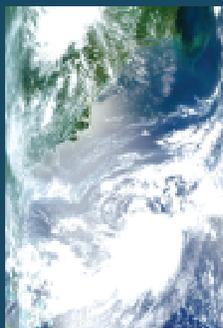


Chlorophyll



SST

12 minute MODIS pass from University of Wisconsin DB Station, processed from Level-0 through Level-2 with SeaDAS



Standard 5-minute MODIS granule processed from Level-0 to Level-2 by OBPG

OceanColor SeaDAS

[Download](#) [Help](#) [Documents](#) [Contact](#) [Links](#) [OceanColor](#) [News](#) [FAQ](#) [Forum](#)

SeaDAS Web

Support

- [SeaDAS Forum](#)
- [Ocean Color Forum](#)
- [Ocean Color Web](#)
- [Ocean Mailing Lists](#)

Download and Installation

We have a new simplified [online installation](#) process. Or, you can manually download SeaDAS, and follow the [installation instructions](#).

Satellite Data

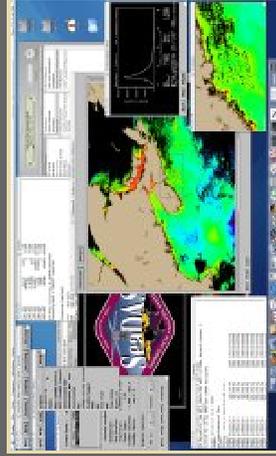
- [Data Product Specifications](#)
- [Processing Versions Chart](#)
- [Level 1 and 2 Browser](#)
- [Level 3 Browser](#)
- [Data by FTP](#)

Ancillary Data

- [METOZONE](#) [INFO](#)
- [NOAA OISST](#) [INFO](#)
- [Aqua ATTEPH](#) [INFO](#)
- [Terra ATTEPH](#) [INFO](#)
- [uicpole.dat](#) [INFO](#)
- [leapsec.dat](#) [INFO](#)
- [elements.dat](#) [INFO](#)

What is SeaDAS

The SeaWiFS Data Analysis System (SeaDAS) is a comprehensive image analysis package for the **processing, display, analysis, and quality control** of ocean color data.



Supported satellite sensors are [MODIS](#), [SeaWiFS](#), [CZCS](#), [OCTS](#), [MOS](#), [OSMI](#), and [AVHRR](#).

- [Features](#)
- [Requirements](#)
- [Online Help](#)
- [Known Problems](#)
- [History of Events](#)
- [References](#)

[SeaDAS 4.8 Distribution Statistics](#)
[SeaDAS 4.7 Distribution Statistics](#)
[SeaDAS Software Usage Policy](#)
seadass@seadass.gsfc.nasa.gov

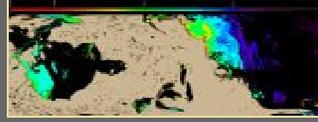
What's New

SeaDAS 4.8.4 released

- New MODIS L1A 1km extraction tool
- Process subscenes to L1B, L2, L3
- Display/navigation of L1A, L1B, L2, and L3 subscenes
- New redesigned ms112 GUI window
- ms112 now accepts user specified MODIS lat/lon processing subsets
- New processing binaries
- New Aqua LUTs (V5.0.7.6d)

MODISL1DB 1.2 released

MODISL1DB is intended for Direct Broadcast users, containing only the portions of SeaDAS for processing MODIS Aqua and Terra L0 data to L1A and L1B.



MODIS Direct Broadcast Chlorophyll a
(Courtesy Univ. of Wisconsin-Madison)

We now have 4 SeaDAS mirrors helping us to distribute SeaDAS 4.8. The OBPG would like to thank those who have so kindly donated their resources. **THANK YOU!!!**

SeaDAS 4.8 Online Installation

Select a SeaDAS ftp download site:

USA (Goddard Space Flight Center, Maryland)

Select your operating system:

Mac OS X 10.3

Select your UNIX shell environment: (execute "echo \$SHELL" to determine your shell)

Bourne-Again shell (bash)

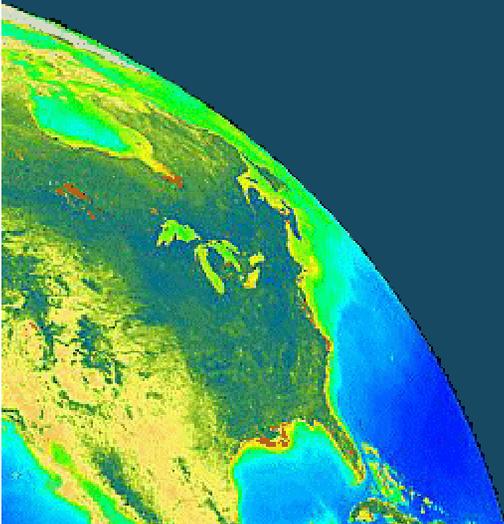
Runtime SeaDAS includes a free IDL embedded license. (If you have a full IDL license you can easily toggle between using full IDL and this runtime mode.)

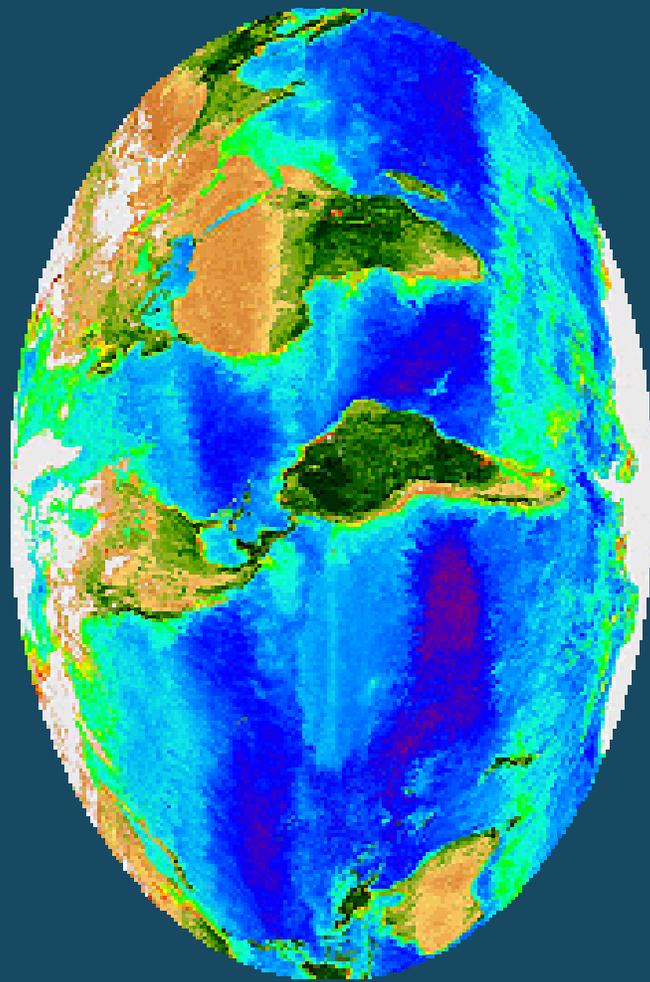
- I will use runtime SeaDAS.
- I have IDL and do NOT wish to download the runtime capability at this time.

Select from the following supporting data files:

- Optional - Data files required for all SeaDAS data processing (seadas_processing.tar.gz, 400MB)
- Optional - Digital elevation map for processing over land and high altitude lakes (seadas_dem.tar.gz, 250MB)
- Optional - Digital elevation maps for MODIS geolocation terrain correction (seadas_dem_modis.tar.gz, 565MB)

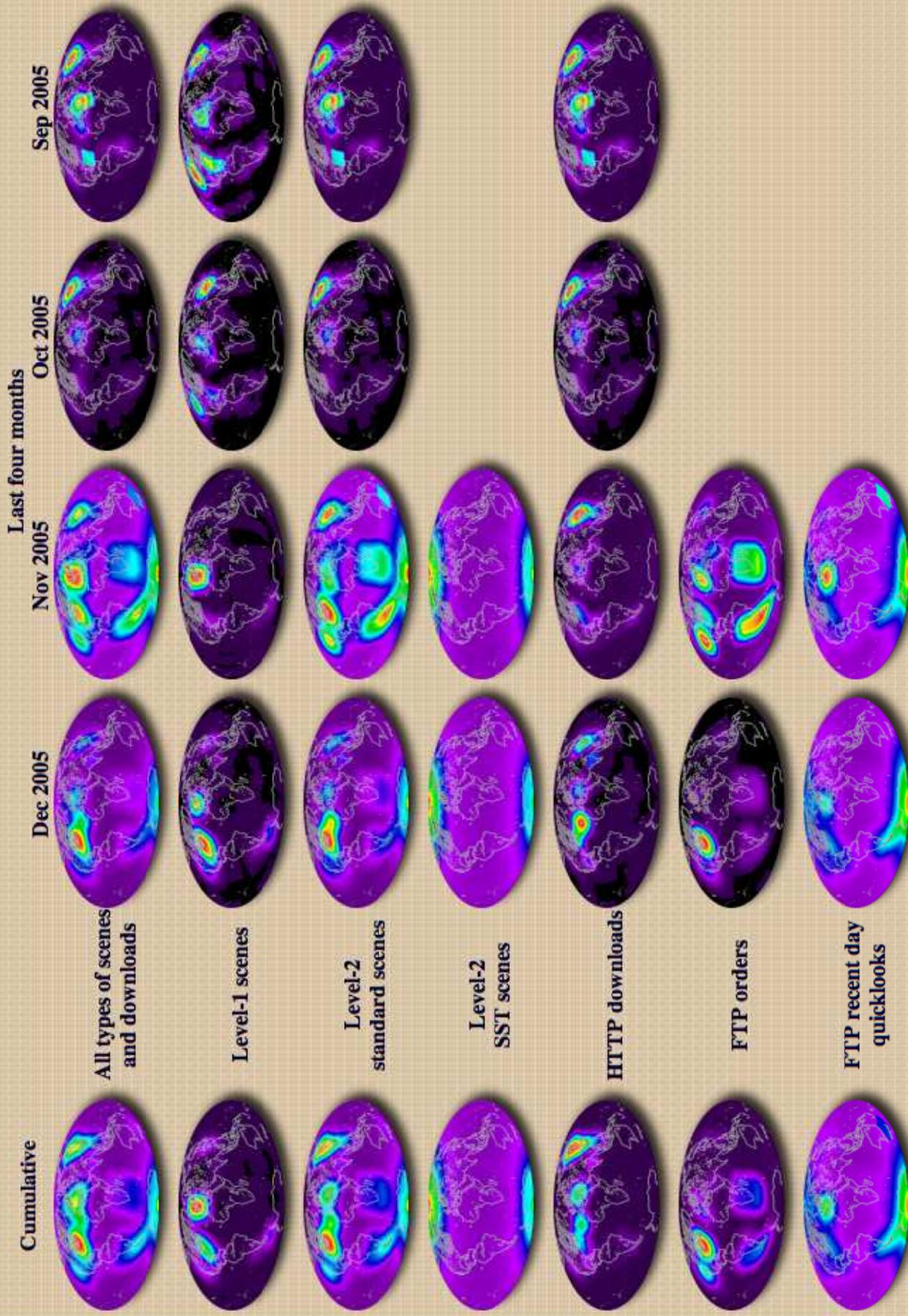
<http://oceancolor.gsfc.nasa.gov/>





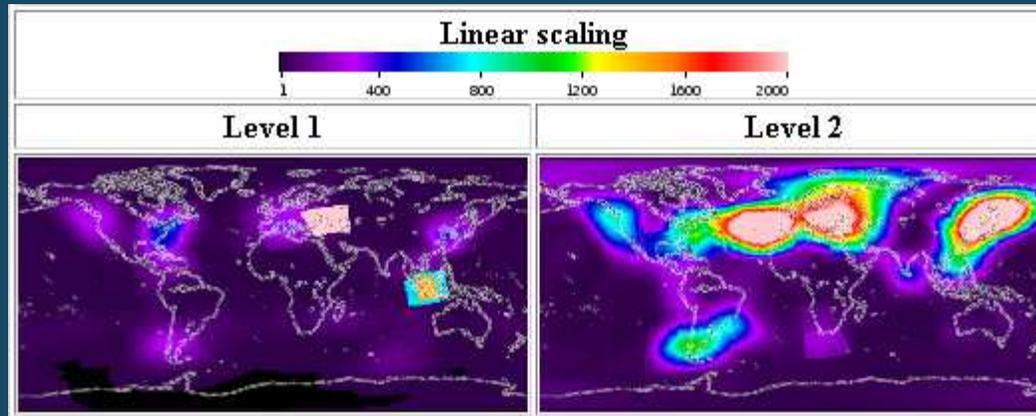
Notes

Regional Download Statistics for Aqua-MODIS

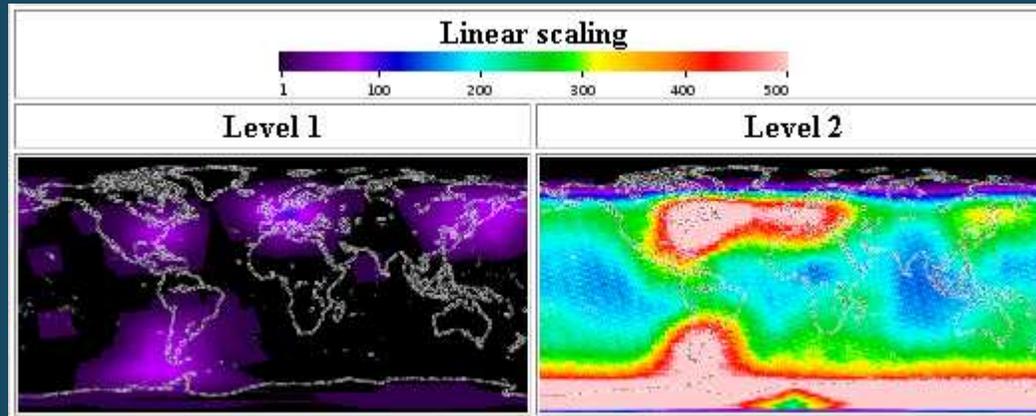


Geographical Distribution of File Downloads

Web Browser Downloads



FTP Downloads



European and Asian researchers prefer web access, while American and Southern Ocean folks prefer ftp.

Most Data Available By FTP

Simplifying Data Access

- All Level-3 data available
 - bin & map files
 - daily, 8-day, monthly
 - seasonals & climatologies
- Rolling archives of Level-1 & 2
 - quicklook
 - refined
 - 30-days
- All ancillary files
 - meteorological data
 - ozone data
 - attitude & ephemerides

MODIS Aqua

Binned

[Level 3 Binned Standard Product Suite](#)

[Binned Daily](#)

[Binned Daily / 3Day Quicklook](#)

[Binned 8Day](#)

[Binned Monthly](#)

[Binned Monthly Climatology](#)

[Binned Seasonal](#)

[Binned Seasonal Climatology](#)

[Binned Annual](#)

Mapped

[Level 3 Mapped Standard Product Suite](#)

[Mapped Daily](#)

[Mapped Daily / 3Day Quicklook](#)

[Mapped 8Day](#)

[Mapped Monthly](#)

[Mapped Monthly Climatology](#)

[Mapped Seasonal](#)

[Mapped Seasonal Climatology](#)

[Mapped Annual](#)

Level 1, GEO, & Level 2

[Quicklook Daytime](#)

[Refined Daytime](#)

SeaWiFS Level 3

Binned

[Level 3 Binned Standard Product Suite and PAR](#)

[Binned Daily](#)

[Binned 8 Day](#)

[Binned Monthly](#)

[Binned Monthly Climatology](#)

[Binned Seasonal](#)

[Binned Annual](#)

Mapped

[Level 3 Mapped Standard Product Suite and PAR](#)

[Mapped Daily](#)

[Mapped 8 Day](#)

[Mapped Monthly](#)

[Mapped Monthly Climatology](#)

[Mapped Seasonal](#)

[Mapped Annual](#)

Ancillary Products

[METOZ](#): NCEP Meteorological (MET) and TOMS/TOAST Ozone (OZ) ancillary data used for L1 L2 processing (updated every 4 hours)

[OISST](#): NOAA Optimum Interpolation (OI) Sea Surface Temperature. These files are used as input for the L1 L2 SST processing

[MODISA/ATTEPH](#): MODIS Aqua definitive attitude and ephemeris data

[MODISA/CAL](#): Updated MODIS Aqua Level 1B LUTs (Look-up tables) and Geolocation files

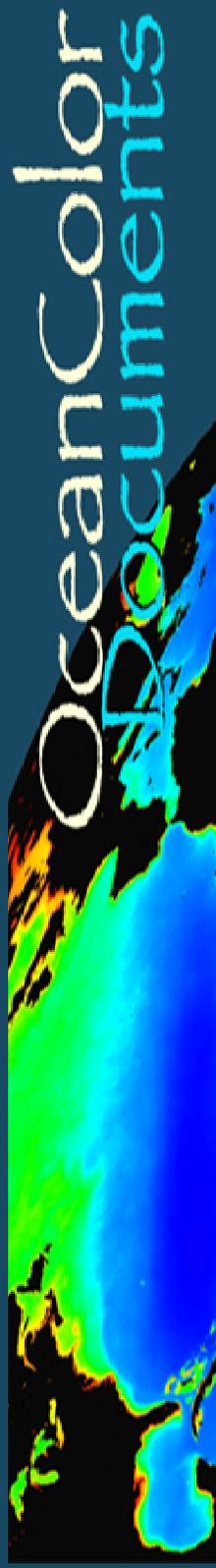
[MODIS/T/CAL](#): Updated MODIS Terra Level 1B LUTs and Geolocation files

[utopole.dat](#): Most recent version of the Earth motion file used in Level 1 processing.

[leapsec.dat](#): Most recent version of the Leap seconds file - required for accurate time conversions in Level 1 processing.

[SeaWiFS GPS elements \(elements.dat\)](#)

[Global 1 Kilometer Land Mask \(landmask.dat\) Documentation](#)



Ocean Color Data Reprocessing

As algorithms mature, reprocessing of the data set is required to improve the archived products. Additionally, it occasionally becomes necessary to redefine the archive product suite as more useful data products are recommended to the Project. To address these issues, periodic reprocessings are planned by the Project. The Ocean Color Data Processing staff continues to work diligently to address those problems that remain in the data products. Further details on current and past reprocessing efforts are available below.

SeaWiFS

[Reprocessing 5.1 - Completed July 5, 2005](#)

[Reprocessing 5 - Completed March 18, 2005](#)

[Reprocessing 4.1 - Completed May 24, 2004](#)

[Reprocessing 4 - Completed July 25, 2002](#)

[Reprocessing 3 - Completed May 24, 2000](#)

[Reprocessing 2 - August, 1998](#)

[Reprocessing 1 - January, 1998](#)

[Calibration Update - April 10, 2001](#)

[Calibration Update - December 1, 2000](#)

Aqua

[Reprocessing 1.1 - Completed August 4, 2005](#)

[Reprocessing 1 - Completed February 2005](#)

[Initial Processing by ODPS - Completed May 24, 2004](#)

Curator: [OceanColor Webmaster](#)

Authorized by: [gene carl feldman](#)

Updated: 10 August 2005

[Security, Privacy, and Accessibility Policy](#)



The Ocean Color Web <http://oceancolor.gsfc.nasa.gov> was developed and is maintained by the Ocean Biology Processing Group (OBPG) at NASA's Goddard Space Flight Center as a means for disseminating information and data in support of NASA's Ocean Color program. The OBPG is responsible for the processing, validation, and distribution of Ocean Color and SST data from MODIS, and Ocean Color data from SeaWiFS, OCTS, and CZCS. The Ocean Color web is the public interface to a fully automated data system for acquisition, processing, analysis, and distribution of data from these spaceborne sensors. Key features include web and ftp-based data access, timely availability of data products, data subscription services, parameter and regional subsetting, image support for field campaigns, extensive documentation, and user support forums. This paper presents an overview of the valuable Ocean Color Web resources that allow the scientific community to browse, download, and analyze Ocean Color and SST data from multiple satellites.

Current Level-1 & Level-2 Data Latency

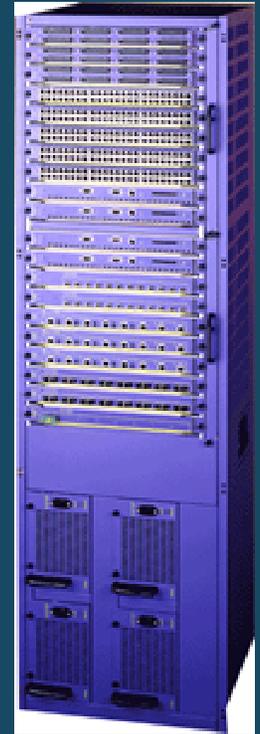
Minimizing Time Between Observation and Data Availability

- MODIS/Aqua Level-1 & Level-2 Ocean Color & SST
 - Quicklook, average latency 4 hours, 52 minutes
 - Refined, available within 2-8 days
- MODIS/Terra Level-1
 - Quicklook, average latency 4 hours, 38 minutes
- SeaWiFS Level-1 & Level-2 Ocean Color
 - Quicklook, 1-13 hours (2 downlinks per day)
 - Refined, available within 4 days
- Latency minimization facilitates near real-time applications
 - coastal monitoring (HAB detection), GHRSSST, cruise support

Data Processing and Storage

- database controlled, distributed processing and storage system
- many Linux-based, processing nodes (34 dual 3GHz Xeon)
- 200X processing for MODIS/Aqua ocean color
- 4000X processing through-put for SeaWiFS ocean color
- 9-month OCTS mission can be reprocessed over lunch
- all data online for direct access (100TB RAID-5 array)
- capacity for global mission testing prior to reprocessing, allowing opportunity for community participation in reprocessing decisions
- direct and near real-time user access to data archives

gigabit ethernet



processing node



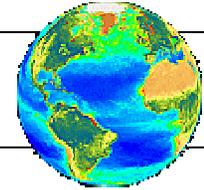
storage node



database server



Ocean Biology Data Processing System - Processing Node

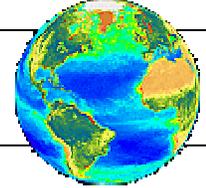


Supermicro 6024 rack mount server

- 2 Intel Xeon CPUs 3.06 Ghz**
- 8 1 GB DDR2 RAM modules**
- 2 Intel Gigabit Ethernet network interfaces**
- 1 Seagate 80 GB EIDE disk (system)**
- 5 Maxtor 73.4 GB Atlas 10K IV Ultra320 SCSI disks (processing)**
- 1 CD-ROM (low profile)**
- 1 Supermicro X5DP8-G2 motherboard with built-in Ultra320 SCSI controller**
- 1 Supermicro 6024H 2U rack mount server case with dual power supplies**

Operating system: Linux

Ocean Biology Data Processing System - Storage Node

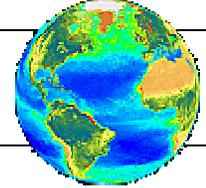


NAS 1.2 TB rack mount server

- 1 Intel Pentium-4 CPU 3.06 Ghz**
- 2 512 MB DDR2 RAM modules**
- 1 Gigabit Ethernet network interface**
- 1 Seagate 80 GB EIDE disk (system)**
- 8 Maxtor 250 GB MaxLine Plus II EIDE disks (RAID 5, 6 data + 2 hot spares)**
- 1 CD-ROM (low profile)**
- 1 Asus P4C800-E Motherboard**
- 1 3ware Escalade RAID controller for 8 drives**
- 1 Comix Computer RM-3U9SCA (IDE) ATX rackmount chassis 3 U, 9 hot swappable drive bays**

Operating system: Linux

Ocean Biology Data Processing System - Large Server



SunFire V880 rack mounted

4-8 UltraSPARC-III+ processors

8-16 GB RAM

6-12 73 GB 10K RPM FibreChannel disks

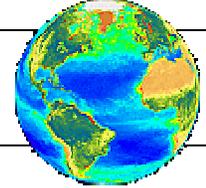
2 Gigabit Ethernet network interfaces

1-5 Fast Ethernet network interfaces

1 External FibreChannel adapter

Operating system: Solaris

Ocean Biology Data Processing System - Network Switch



Extreme Networks Black Diamond 6816

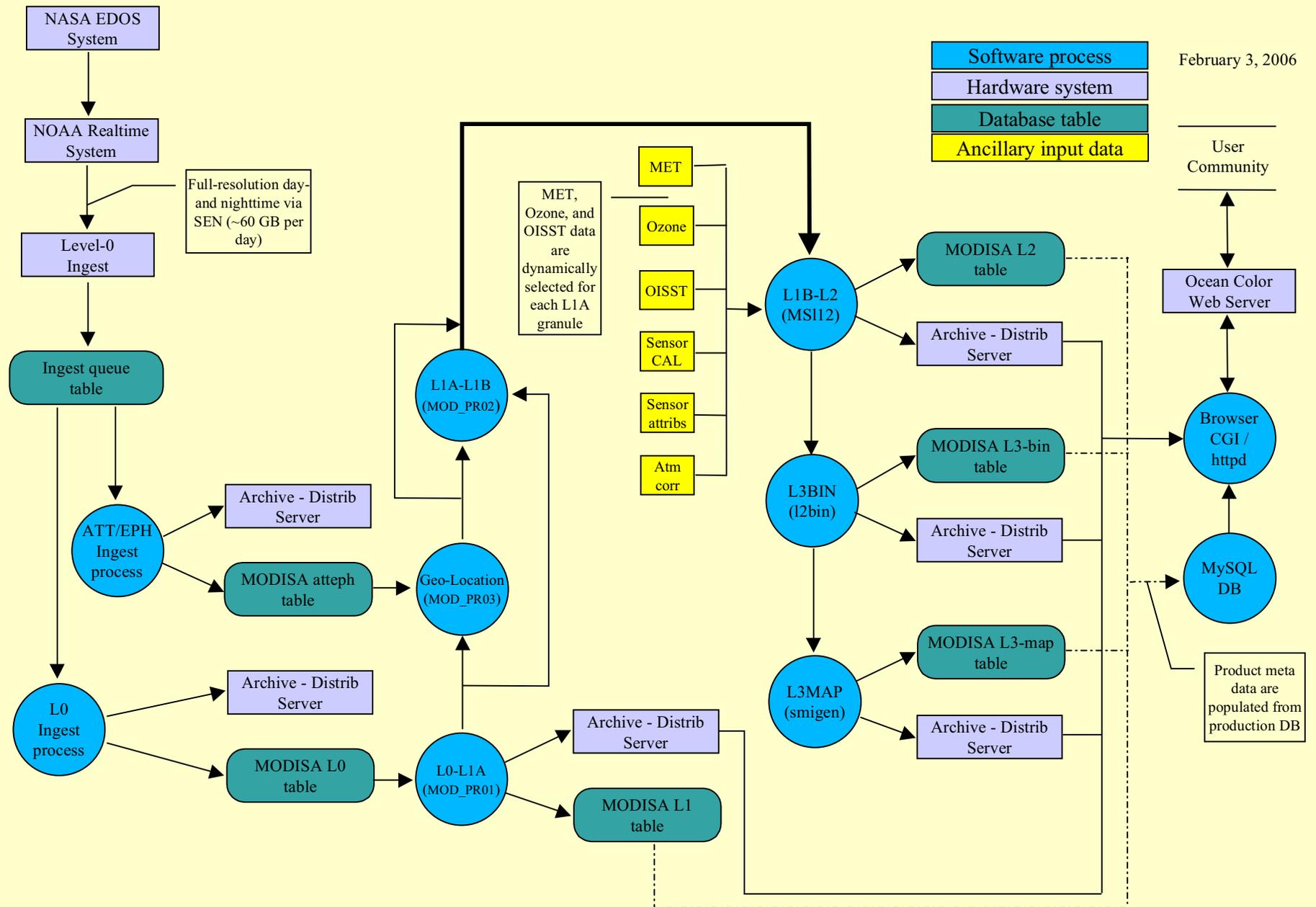
**768 Gbps total switching capacity
Route/filter/forward 192 million pps**

160 GigE ports in current configuration

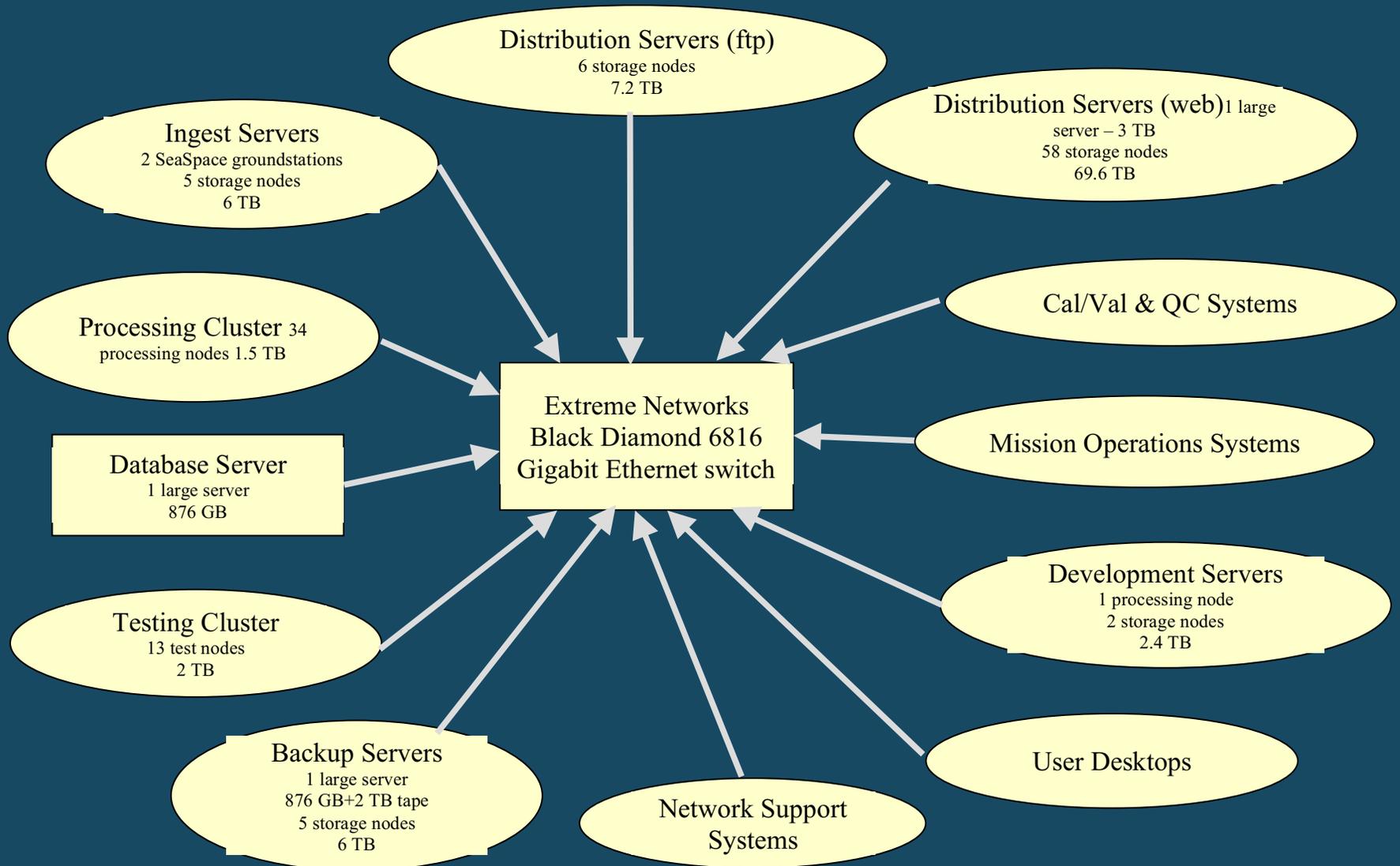
All modules are hot swappable

- 4 MSM management modules**
- 2 G8Ti 8 port Gigabit Ethernet modules**
- 6 G24T3 24 port Gigabit Ethernet modules**
- 4 Hot-swappable power supplies**

Operational MODIS-Aqua Data Flow



ODPS Data Processing System Current Components



Time-Series Utility

Sensor	SeaWiFS	Region	Plot End Date		Number of Periods	Get plot	Text version	Help
Product	Chlorophyll concentration	global	4	Aug	2005			
Binning Period	Eight-day				365			

